Commonwealth of Kentucky
Division for Air Quality

PERMIT STATEMENT OF BASIS

CONDITIONAL MAJOR (DRAFT PERMIT) NO. F-06-019
EASTERN KENTUCKY CORRECTIONAL COMPLEX
WEST LIBERTY, KY.
JUNE 29, 2006
BRIAN BALLARD, REVIEWER

SOURCE I.D. #:	021-175-00019
SOURCE A.I. #:	3203
ACTIVITY #:	APE20040001

SOURCE DESCRIPTION:
The Kentucky Division for Air Quality (KYDAQ) received a source-wide permit application from Eastern Kentucky Correctional Complex (EKCC) on December 17, 2003. The application was submitted as required by Remedial Measure 13 (b) of the agreed order filed December 4, 2003, Case No. DAQ-02051.

EKCC currently holds air quality permit No. O-92-051 and C-94-019 issued by KYDAQ on June 19, 1992 and September 21, 1994, respectively.

The December 2003 application indicates emission sources at EKCC are:

- Coal-fired boilers and a natural gas boiler all of which are significant emission points.

- Wood Furniture Plant consisting of a paint strip tank utilizing a dichloromethane (CAS No. 75-09-2) stripping solvent, equipment for sanding, cutting and sawing wood, water based stain application by brush and water based lacquer application in a paint spray booth.

- Metal Furniture Manufacturing and Refurbishing/Refinish Plant consisting of a paint strip furnace, spray washer with heater for metal parts, baking/drying oven and a powder coating operation. There are also emissions from welding associated with the metal furniture plant.

- Three fuel storage tanks. A 3,000 gallon #2 Diesel fuel storage tank, a 1,500 gallon gasoline storage tank and a 400 gallon #2 Diesel fuel storage tank. All tanks are horizontal and underground.

COMMENTS:

Boilers

Emissions of regulated pollutants from the coal-fired boilers are determined using emission factors from AP 42 and stack test data. The emission factors for CO and NO_X are referenced from AP 42 (9/98), Table 1.1-3, Underfeed Stoker (SCC: 10300208). The VOC emission factor is referenced from AP 42 (9/98), Table 1.1-19, Underfeed Stoker (SCC: 10300208), and is assumed to equal the Total Non-Methane Organic Compounds (TNMOC) emission factor. The $PM_{2.5}$ emission factor is referenced from AP 42 (9/98), Table 1.1-11. The lead emission factor is referenced from AP 42 (9/98), Table 1.1-18. The filterable Particulate Matter (PM) emission factor is based on the emissions determined during the performance test conducted on April 22, 2003 for Boiler No. 4. The sulfur dioxide emission factor is based on the emissions determined during the performance test conducted on September 13, 2002 for Boiler No. 4. These PM and SO_2 emission factors are used for Boilers 1, 2, 3 and 4. The application specifies that the coal burned in these Boilers has an ash content of 6.0 percent and a sulfur content of 0.8 percent. The application specifies that the heat content of the coal is 13,700 Btu/lb. Boilers 1 through 4 are equipped with high efficiency cyclones. Potential to emit is based on operating 8,760 hours per year.

Applicable Regulations: Boilers 1, 2 and 4 are subject to the SO_2 standard specified in 40 CFR 60, Subpart Dc and the PM, Opacity and SO_2 standards specified in 401 KAR 59:015. Compliance with the SO_2 standard specified in Subpart Dc will serve the purpose of demonstrating compliance with the SO_2 standard in 401 KAR 59:015. Boiler 3 is subject to the PM, Opacity and SO_2 standards in 401 KAR 59:015. Compliance with the standards must be verified through testing no later than 180 days from the final issuance date of the permit.

Emissions of regulated pollutants from the natural gas boiler are determined using emission factors from AP 42. The emission factors for CO and NO_X are referenced from AP 42 (7/98), Table 1.4-1. Particulate Matter (PM), lead, SO_2 and VOC emission factors are referenced from AP 42 (7/98), Table 1.4-2. Potential to emit is based on operating 8,760 hours per year.

Applicable Regulations: Boiler 5 is subject to the SO_2 standard specified in 40 CFR 60, Subpart Dc and the PM, Opacity and SO_2 standards specified in 401 KAR 59:015. Compliance with the standards is assumed as long as the boiler is burning pipeline grade natural gas.

Wood Furniture Plant

Emissions of dichloromethane (methylene chloride), methanol and VOC from the paint strip tank are determined using data supplied in the application and additional information received on March 22, 2006. An hourly usage rate of paint remover is determined by taking the higher of annual usage rates for the years 2004 and 2005 and dividing by an operating schedule of 8 hours per day, 5 days per week and 52 weeks per year. The hourly usage rate of paint remover determined is (1,350 gallons / 2080 hours) or 0.649 gallons per hour. It is assumed that the entire content of dichloromethane, methanol and VOC are emitted from the used paint remover. The density of the paint remover is 10.008 lb/gal and the dichloromethane content is 85 percent based on the material safety data sheet (MSDS) supplied with the application. The emission factor for dichloromethane is 10.008*0.85 or 8.51 lb/gal. The potential to emit of dichloromethane is (0.649 gal/hr)*(8.51 lb/gal)*(8,760 hr/yr) = 48,381 lb/yr or 24.19 tons/yr. The emissions of methanol and VOC are determined using the same methodology.

COMMENTS (CONTINUED):
The SCREEN3 model was run using information submitted by Mr. Gunvant Shah, Department of Corrections Engineer, by e-mail on April 20, 2006. The paint strip tank was modeled as a point source emitting at ground level. At 300 feet, the shortest distance from the emission point to the property boundary, the annual methylene chloride concentration based on potential emissions predicted by the model was 283.5 $\mu g/m^3$. This concentration is well above the benchmark concentration based on the Prioritized Chronic Dose-Repsonse Value (PDRV) (4.7 x 10-7 $(\mu g/m^3)^{-1}$ found in guidance recommend by the EPA Office of Air Quality Planning and Standards (OAQPS) and the assumption of an acceptable cancer risk being less than one-in-a-million (1×10^{-6}). The benchmark concentration is $[(1 \times 10^{-6})/ (4.7 \times 10\text{-}7\ (\mu g/m^3)^{-1}] = 2.13\ \mu g/m^3$.

Based on the results of the screening model, the Division would like to state for the record that it is likely that the methylene chloride emissions from this source will be regulated under the anticipated state air toxics regulation currently being developed by the Cabinet.

It is recommended that EKCC determine the actual methylene chloride emission rate from the paint strip tank. This could be accomplished by measuring the concentration of methylene chloride in the vent stream from the paint strip tank. This emission rate could then be modeled using an acceptable regulatory model such as ISCST3 or Aermod to determine the concentration of methylene chloride at the property boundary. If this concentration is still significantly above the benchmark concentration referred to above, EKCC is strongly encouraged to take steps to reduce methylene chloride emissions from this operation.

These steps could include switching to a less toxic paint stripper, or installing some type of control device (e.g., carbon filter) to reduce the concentration of methylene chloride in the vent stream from the paint stripping operation.

Emissions of PM from the sanding, cutting and sawing of wood is based on the statement in the December 2003 application that the plant used 54,000 board feet of lumber in 2003. An hourly board feet rate is determined by dividing 54,000 Board feet by 2,080 hours per year of operation. An average wood density of 33.09 lb/ft^3 is assumed and it is assumed that 0.1 lb of wood waste is generated per lb of wood processed. Per the application, each sanding operation is connected to a self-contained dust collection system, each of which circulates filtered air back into the space. Emission factors for PM and PM_{10} are referenced from EPA's Factor Information Retrieval (FIRE) Data System, SCC 30702003. Potential to emit is based 8,760 hours per year. This is an insignificant activity.

Applicable Regulation: Sanding, cutting and sawing of wood is subject to the PM standard in 401 KAR 59:010. Based on the information provided in the application the sanding operation will be in compliance with the standard since it vents to a dust collection system that vents inside the workspace. The cutting and sawing operations are expected to be in compliance with the standard due the large size of PM generated from these activities and its tendency to settle out in the workspace.

COMMENTS (CONTINUED):
Emission of VOC from the brushing on of stain and spraying of lacquer is determined assuming the entire content of VOC in the stain and lacquer is emitted. PM/PM_{10} emissions from the spraying of lacquer occur in a spray booth equipped with high efficiency paint arrestor filters. A transfer efficiency of 40 percent is used in calculating the PM/PM_{10} emission factor. A control efficiency of 90 percent is used in calculating the PM/PM_{10} emission rate. The emission rates of VOC and PM/PM_{10} are based on the maximum hourly capacities specified in the December 2003 application. Potential to emit is based on operating 8,760 hours per year.

Applicable Regulations:
Lacquer application in the spray booth is subject to the PM standard in 401 KAR 59:010. Compliance with PM standard will be assumed when the booth and associated equipment is operated and maintained in accordance with the manufacturer's recommendations. Compliance with the opacity standard will be verified by weekly qualitative visual observations.

EKCC is subject to 40 CFR 63.800 to 63.808 (Subpart JJ), "National Emission Standards for Wood Furniture Manufacturing Operations", because it was a major source for HAP emissions after the initial compliance date for existing affected sources that emit less than 50 tons per year of HAP. This date is December 7, 1998. The facility was major due to potential HAP emissions from the paint strip tank (EP06 in permit F-06-019). Section 63.800 (a) of Subpart JJ specifies that a source that meets the definition for an incidental wood furniture manufacturer shall maintain purchase or usage records demonstrating that the source meets the definition in § 63.801 of the rule, but the source shall not be subject to any other provisions of Subpart JJ. An incidental wood furniture manufacturer is defined in Subpart JJ as a major source that is primarily engaged in the manufacture of products other than wood furniture or wood furniture components that uses no more than 100 gallons per month of finishing material or adhesives in the manufacture of wood furniture or wood furniture components.

Metal Furniture Manufacturing and Refurbishing/Refinish Plant

Emissions of regulated pollutants from the paint strip furnace, spray washer heater and baking drying/oven are determined using emission factors from AP 42. The emission factors for CO and NO_X are referenced from AP 42 (7/98), Table 1.4-1. Particulate Matter (PM), lead, SO_2 and VOC emission factors are referenced from AP 42 (7/98), Table 1.4-2. Potential to emit is based on operating 8,760 hours per year. As indicated in manufacturer documentation included with the December 2003 application, the paint strip furnace consists of a primary processing chamber, an after burner chamber, a primary burner fire box, temperature and safety controls. The manufacturer documentation specifies that volatiles are oxidized in the afterburner at 1200˚F - 1400˚F for 0.5 to 0.8 seconds and that the end result of this oxidation is primarily carbon dioxide and water vapor which are exhausted to the atmosphere. These items are insignificant activities.

Emissions of VOC from the spray washer are based on the maximum hourly usage rates of cleaning and rinsing agents specified in the December 2003 application, assuming the entire content of VOC in the raw materials is emitted. Potential to emit is based on operating 8,760 hours per year. This is an insignificant activity.

COMMENTS (CONTINUED):
Emissions of VOC from the Powder Paint Booth are based on the maximum hourly throughput of powder paint specified in the December 2003 application, assuming the entire content of VOC in the powder is emitted. Potential to emit is based on 8,760 hours per year of operation. There are no PM/PM_{10} emissions from this operation since it is specified in the December 2003 application that there is no exhaust to the exterior from this paint booth and that self-contained paint booth filters capture excess powder, which is recycled to the paint booth. This is an insignificant activity.

EKCC is not subject to 40 CFR 60.310 to 60.316 (Subpart EE), "Standards of Performance for Surface Coating of Metal Furniture", as specified in the following the sections of the rule:
§ 60.310 (a) The affected facility to which the provisions of this subpart apply is each metal furniture surface coating operation in which organic coatings are applied.
§ 60.311 (a) Organic coating means any coating used in a surface coating operation, including dilution solvents, from which volatile organic compound emissions during the application or the curing process. For the purpose of this regulation, powder coatings are not included in this definition.
§ 60.311 (a) Powder coating means any surface coating which is applied as a dry powder and is fused into a continuous coating film through the use of heat.

EKCC is not subject to 40 CFR 63.4880 to 63.4981 (Subpart RRRR), "National Emissions Standards for Hazardous Air Pollutants: Surface Coating of Metal Furniture", as specified in the following section of the rule:
§ 63.4881 (c) This subpart does not apply to surface coating that meets any of the criteria of paragraphs (c) (1) through (6) of this section.
(1) Surface coating at an affected source that uses only coatings, thinners, and cleaning materials that contain no organic HAP.

EMISSION AND OPERATING CAPS DESCRIPTION:
EKCC will be subject to source wide emission caps of 9.0 tons per rolling twelve-month total for single Hazardous Air Pollutant (HAP) and 22.5 tons per rolling twelve-month total for combined HAPs. These emission caps will preclude applicability of 40 CFR 63.40 to 63.56 (Subpart B), "Requirements for Control Technology Determinations for Major Sources in Accordance with Clean Air Act Sections, Sections 112(g) and 112(j)". The emission caps will also preclude applicability of 40 CFR 63.7480 to 63.7575 (Subpart DDDDD), "National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters".

PERIODIC MONITORING:

Emission Point Number(s)	Description	Monitoring Requirement(s)
01(01) 02(02) 03(04) 04(03)	Boiler 1 Boiler 2 Boiler 4 Boiler 3	Emissions of regulated pollutants shall be calculated each month using emission factors, fuel usage rates, and average fuel sulfur heat content. The permittee shall monitor the amount of fuel combusted on a daily basis.
05(05)	Boiler 5	The source wide volume of natural gas burned shall be monitored monthly.
06(W1)	Wood Furniture Plant Paint Strip Tank	The monthly usage of paint remover shall be monitored. [Refer to Section D of the permit]
07(W3&W4)	Wood Furniture Plant Surface Coating	The monthly usage in gallons of stains, lacquers, adhesives or any other wood finishing material shall be monitored. Perform weekly qualitative visual observations of opacity from spray booth stack.

CREDIBLE EVIDENCE:

This permit contains provisions which require that specific test methods, monitoring or recordkeeping be used as a demonstration of compliance with permit limits. On February 24, 1997, the U.S. EPA promulgated revisions to the following federal regulations: 40 CFR Part 51, Sec. 51.212; 40 CFR Part 52, Sec. 52.12; 40 CFR Part 52, Sec. 52.30; 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12, that allow the use of credible evidence to establish compliance with applicable requirements. At the issuance of this permit, Kentucky has only adopted the provisions of 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12 into its air quality regulations.